

The present invention is directed to a method of forming a film on a substrate comprising the steps of forming a first layer comprising silicon oxide on a substrate by CVD wherein the first reactive gas used to form the layer is carbon free and forming a second layer comprising silicon oxide on said first layer by CVD wherein the second reactive gas includes at least tetra-ethyl-oxysilane (TEOS). In addition, the method of the present invention may include the formation by CVD of a silicon oxide layer from a reactive gas including at least TEOS wherein the reactive gas may be supplied with energy to activate the gas. In all variations of the present invention, the use of TEOS advantageously provides a uniform film over a substrate even when the surface of the substrate is uneven. The ability to form a film of uniform thickness on a substrate enhances the overall quality of the finished substrates. In addition, the process of the present invention provides a more rapid and less expensive production of films over a substrate.

Claims 7-10 were rejected in the parent application under 35 U.S.C. §103 over Ghandi in view of Haku et al. and Shigetomi. Ghandi discloses that silicon dioxide may be grown at low pressure in a plasma-enhanced system using a plasma consisting of  $\text{SiH}_4$  and  $\text{O}_2$ . Ghandi, however, fails to disclose a two step deposition process including the steps of introducing a first carbon free reactive gas which is supplied with energy, preferably photo energy (claim 10) to deposit a first layer, followed by introducing a second reactive gas comprising TEOS which is converted to a plasma to deposit a silicon oxide film on the first layer.


Haku et al. discloses the formation of a plurality of amorphous thin layers of different kinds wherein at least one kind of layer is formed by photo CVD and a second layer by plasma CVD. Haku et al. does not teach

or suggest a second reactive gas of TEOS. In addition, although the reference discloses that one of the layers may be  $\text{SiO}_2$ , it fails to suggest that both layers may be the same composition. In fact, it teaches the complete opposite by requiring alternating multi-layers of different composition. Applicants believe that there is no reason to form the silicon oxide of Ghandi by plural CVD steps taught by Haku et al. since the multi-layered film of Haku et al. is functionally different from a simple silicon dioxide layer, that is, the multi-layered film of Haku et al. is for example a superlattice device. Moreover, it does not appear that the first layer disclosed in Haku et al. is designed to provide protection or a buffer for the substrate itself. As a result, claims 7-10 should be considered allowable.

Claims 11-15 have also been added to recite additional novel aspects of the present invention which should likewise be considered allowable.

In view of the foregoing amendments and remarks, it is urged that claims 11-15 are in a condition for allowance and a notice to that effect is respectfully requested. If the Examiner believes that a conference would expedite the prosecution of the instant application, he is hereby invited to telephone the undersigned to arrange such a conference.

Respectfully submitted,

  
Jeffrey L. Costellia  
Reg. No. 35,483

Sixbey, Friedman, Leedom & Ferguson, P.C.  
2010 Corporate Ridge, Suite 600  
McLean, Virginia 22102  
(703) 790-9110